UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,658	11/24/2003	John Terry	042933/303048	4642

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EXAMINER
DEAN, RAYMOND S

ART UNIT	PAPER NUMBER
2684	

DATE MAILED: 03/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/720,658	TERRY ET AL.
	Examiner	**Art Unit**	
	Raymond S. Dean	2684	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *24 November 2003*.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1 - 20* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1 - 20* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *15 March 2004* is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some *   c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2.   Claims 1 – 11, and 16 – 17 are rejected under 35 U.S.C. 102(e) as being

anticipated by Mantravadi et al. (US 2005/0068918).

Regarding Claims 1, 16, Mantravadi teaches in a communication system having

a sending station for sending communication data upon a communication channel

susceptible to distortion (Figure 4A, the data will be transmitted over an RF channel,

which is susceptible to distortion such as noise and fading), an improvement of

apparatus for placing the communication data in a form to facilitate the communication

thereof upon the communication channel, said apparatus comprising: a first mapper

adapted to receive first representations of a first portion of the communication data

(Figure 4A, Section 0005 lines 5 – 6, Section 0105, the modulator (416a) is the first

mapper, the first portion of the communication data is the base data stream), said first

mapper for mapping the first representations of the first portion of the communication

data into first mapped values according to a first mapping scheme (Section 0105, the

modulator (416a) can use a plurality of modulation/mapping schemes thus there will be

a first mapping scheme); a second mapper adapted to receive second representations

of a second portion of the communication data (Figure 4A, Section 0106 lines 1 – 6,

the modulator (416b) is the second mapper, the second portion of the communication

data is the enhanced data stream), said second mapper for mapping the second

representations of the communication data into second mapped values according to a

second mapping scheme (Figure 4A, Section 0106 lines 1 – 6, the modulator (416b)

can use a plurality of modulation/mapping schemes just like the first mapper (416a)),

the second mapping scheme exhibiting a mapping property that differs with the first

mapping scheme (Sections 0105, 0106 lines 1 – 6, the modulators (416a, 416b) can

use a plurality of modulation/mapping schemes thus modulator (416a) can use a

modulation/mapping scheme that differs from the modulation/mapping scheme of

modulator (416b)); a set of antenna transducers comprising a first antenna transducer

and at least a second antenna transducer (Figure 4A, antenna transducers

(324a,324b), at least a selected one of the antenna transducers of said set adapted to

receive at least parts of the first mapped values and the second mapped values formed

by said first mapper and said second mapper, respectively (Figure 4A, Section 0111

lines 10 – 19, each antenna receives a combination of the base data stream and the

enhanced data stream (x sub 1 and x sub 2) for transmission), the at least the selected

one of the antenna transducers of said set for transducing the first and second mapped

values, respectively, applied thereto into electromagnetic form for communication upon

the communication channel (Figure 4A, Section 0111 lines 10 – 19).

Regarding Claim 2, Mantravadi teaches all of the claimed limitations recited in

Claim 1. Mantravadi further teaches a first encoder adapted to receive the first portion

of the communication data, said first encoder for encoding the first portion of the

communication data according to a first encoding techniques (Figure 4A, first encoder

(412a), Section 0105, said encoder can use a plurality of encoding techniques) and

wherein the first representations of the first portion of the communication data to which

said first mapper is adapted to receive comprise first-encoded values formed by said

first encoder (Figure 4A, Section 0105).

Regarding Claim 3, Mantravadi teaches all of the claimed limitations recited in

Claim 1. Mantravadi further teaches a second encoder adapted to receive the second

portion of the communication data, said second encoder for encoding the second

portion of the communication data according to a second encoding technique (Figure

4A, second encoder (412b), Section 0106 lines 1 – 6, said encoder can use a plurality

of encoding techniques just like first encoder (412a)) and wherein the second

representations of the second portion of the communication data to which said second

mapper is adapted to receive comprise second-encoded values formed by said second

encoder (Figure 4A, Section 0106 lines 1 – 6).

Regarding Claim 4, Mantravadi teaches all of the claimed limitations recited in

Claim 1. Mantravadi further teaches wherein the first mapped values into which said

first mapper maps the first representations of the first portion of the communication

data comprises a first set of mapped values, wherein the second mapped values into

which said second mapper maps the second representations of the second portion of

the communication data comprise a second set of mapped values, elements of the first

set of mapped values differing in value with elements of the second set of mapped

values (Sections 0105, 0106 lines 1 – 6, the modulators (416a, 416b) can use a

plurality of modulation/mapping schemes thus modulator (416a) can use a

modulation/mapping scheme that differs from the modulation/mapping scheme of

modulator (416b), since the mapping schemes differ the elements of the mapped

values for each scheme will differ in value).

Regarding Claim 5, Mantravadi teaches all of the claimed limitations recited in

Claim 4. Mantravadi further teaches wherein the first set of mapped values and the

second set of mapped values formed by said first mapper and said second mapper,

respectively, are formed of mutually-exclusive elements (Sections 0105, 0106 lines 1 –

6, since the mapping schemes differ the elements of the mapped values for each

scheme will differ in value and will be mutually-exclusive).

Regarding Claim 6, Mantravadi teaches all of the claimed limitations recited in

Claim 4. Mantravadi further teaches wherein the mapping property exhibited by the

second mapping scheme that differs with that of the first mapping scheme comprises

vector magnitudes that differ (Sections 0105, 0106 lines 1 – 6, the modulators (416a,

416b) can use a plurality of modulation/mapping schemes thus modulator (416a) can

use a modulation/mapping scheme that differs from the modulation/mapping scheme of

modulator (416b), said modulation schemes will have differing constellations and thus

differing vector magnitudes).

Regarding Claim 7, Mantravadi teaches all of the claimed limitations recited in

Claim 1. Mantravadi further teaches wherein the first mapped values into which said

first mapper maps the first representations of the first portion of the communication

data comprise a first set of mapped values that exhibits first geometric differences

there between, wherein the second mapped values into which said second

representations of the second portion of the communication data comprise a second

set of map values that exhibit second geometric differences there between (Sections

0105, 0106 lines 1 – 6, the modulators (416a, 416b) can use a plurality of

modulation/mapping schemes thus modulator (416a) can use a modulation/mapping

scheme that differs from the modulation/mapping scheme of modulator (416b), said

modulation schemes will have differing constellations and thus differing vector

magnitudes, since the constellations differ the geometric differences between the

values or states of the first constellation will differ from the geometric differences

between the values or states of the second constellation).

Regarding Claim 8, Mantravadi teaches all of the claimed limitations recited in

Claim 7. Mantravadi further teaches wherein the first geometric differences between

the mapped values of the first set and the second geometric differences between the

mapped values of the second set are mutually exclusive (Sections 0105, 0106 lines 1 –

6, since the constellations differ the geometric differences between the values or states

of the first constellation will differ from the geometric differences between the values or

states of the second constellation, since said geometric differences are associated with

mapped values that are mutually exclusive the geometric differences will be mutually

exclusive).

Regarding Claim 9, Mantravadi teaches all of the claimed limitations recited in

Claim 7. Mantravadi further teaches wherein the mapping property exhibited by the

second mapping scheme that differs with that of the first mapping scheme comprises

second geometric differences that differ in lengths with lengths of the first geometric

differences (Section 0105, 0106 lines 1 – 6, since the constellations differ the

geometric differences between the values or states of the first constellation will differ

from the geometric differences between the values or states of the second

constellation, said geometric properties comprise lengths thus the lengths will differ).

Regarding Claim 10, Mantravadi teaches all of the claimed limitations recited in

Claim 1. Mantravadi further teaches wherein the mapping by which said first mapper

maps the first representations and the mapping by which said second mapper maps

the second representations are together selected to define a layered code having

combined values that are applied to the at least selected one of said set of antenna

transducers (Figure 4A, Section 0111 lines 10 – 19, the coded data will be combined

via the combiner).

Regarding Claim 11, Mantravadi teaches all of the claimed limitations recited in

Claim 1. Mantravadi further teaches wherein the at least selected one of the antenna

transducers at which the at least parts of the first and the second mapped values,

respectively, are received comprise the first antenna transducer and the at least the

second antenna transducer (Figure 4A, Section 0111 lines 10 – 19, each antenna

receives a combination of the base data stream and the enhanced data stream (x sub

1 and x sub 2) for transmission).

Regarding Claim 17, Mantravadi teaches all of the claimed limitations recited in

Claim 16. Mantravadi further teaches transducing the selected first mapped values

and the selected second mapped values applied during said operation of selectably

applying into electromagnetic form and delivering, by way of the communication

channel, the selected first and second mapped values, respectively, to the receiving

station (Figures 4A, 8A).

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 12 – 15 and 18 – 20 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Mantravadi et al. (US 2005/0068918) in view of Ketchum (US

6,731,668).

Regarding Claims 12, 18, Mantravadi teaches all of the claimed limitations

recited in Claims 1, 17. Mantravadi further teaches a receiving station for receiving the

communication data once communicated upon the communication channel (Figures

8A, 8B), a further improvement of apparatus for the receiving station for facilitating

detection of the communication data, said apparatus comprising: a decoder, which

exploits the difference in mapping properties between the first and second set (Figure

8A, the decoder (836a) decodes the first set), adapted to receive indications of the

communication data communicated upon the communication channel and delivered to

the receiving station (Figure 8A).

Mantravadi does not teach a maximum likelihood decoder, which exploits the

difference in mapping properties between the first and second set, adapted to receive

indications of the communication data communicated upon the communication channel

and delivered to the receiving station, said maximum likelihood decoder for determining

a maximum likelihood path that defines selection of values of the communication data,

the maximum likelihood path selected from amongst a set of possible paths, each

defining communication data value possibilities.

Ketchum teaches a maximum likelihood decoder for determining a maximum

likelihood path that defines selection of values of the communication data, the

maximum likelihood path selected from amongst a set of possible paths, each defining

communication data value possibilities (Column 3 lines 19 – 26, Column 8 lines 45 –

60).

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to modify the receiver of Mantravadi with the Viterbi decoder of

Ketchum as an alternative means of decoding a received signal thus providing an

information sequence with a minimal number of errors as taught by Ketchum.

Regarding Claim 13, Mantravadi in view of Ketchum teaches all of the claimed limitations recited in Claim 12. Ketchum further teaches wherein the set of possible paths from amongst which said maximum likelihood decoder selects the maximum likelihood path comprises fewer than all of the possible paths (Column 3 lines 19 – 26).

Regarding Claims 14, 20, Mantravadi in view of Ketchum teaches all of the claimed limitations recited in Claims 12, 19. Ketchum further teaches wherein the set of possible paths from amongst which said maximum likelihood decoder selects the maximum likelihood path is selected responsive to a mapping scheme pursuant to which a mapper maps representations (Column 3 lines 19 – 26). Mantravadi further teaches a first and second mapping scheme (Sections 0105, 0106 lines 1 – 6).

Regarding Claims 15, Mantravadi in view of Ketchum teaches all of the claimed limitations recited in Claims 14. Ketchum further teaches wherein the set of possible paths from amongst which said maximum likelihood decoder selects the maximum likelihood path is selected responsive to a mapping scheme pursuant to which a mapper maps representations (Column 3 lines 19 – 26). Mantravadi further teaches a first and second mapping scheme (Sections 0105, 0106 lines 1 – 6).

Regarding Claim 19, Mantravadi in view of Ketchum teaches all of the claimed limitations recited in Claim 18. Ketchum further teaches prior to said operation of decoding, of selecting the set of possible paths from which the maximum likelihood path is formable (Column 3 lines 19 – 26).
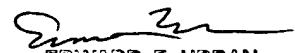
Conclusion

5.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Raymond S. Dean whose telephone number is 571-272-

7877. The examiner can normally be reached on Monday-Friday 6:00-2:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Edward F. Urban can be reached on 571-272-7899. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Raymond S. Dean
February 21, 2006

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